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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,727	01/08/2002	Bowie G. Keefer	6454-61581	6441

7590 11/24/2004

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
EXAMINER

CHANEY, CAROL DIANE

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 11/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/043,727	Applicant(s) KEEFER ET AL. 	
	Examiner Carol Chaney	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-80 is/are pending in the application.
- 4a) Of the above claim(s) 3, 10-26, 35-45, 47-69, 73-77 and 79 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-9, 27-34, 46, 70-72, 78 and 80 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10-16-03, 12-16-02</u> . | 6) <input type="checkbox"/> Other: _____  |

***Election/Restrictions***

Applicant's election with traverse of Group I, species Ia in the reply filed on 09 September 2004 is acknowledged. The traversal is on the ground(s) that claim 54 requires the use of a fuel storage system, an expander and a fuel cell and can not be practiced without an apparatus that includes these features. However, claim 1 does not require a fuel cell, but requires a "power system". The fuel cell as claimed in claim 54 is not necessarily a "power system" because the fuel cell is not required to be operational.

The requirement is still deemed proper and is therefore made FINAL.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 27-34, 46 and 80 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation in claim 27 of "an oxidant-enriched gas" is indefinite because a standard of comparison of "enriched" is not given. Presumably the gas should contain more oxidant than another standard gas, but the oxidant concentration of the "standard" gas is not given.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-9, 70, 72 and 78 are rejected under 35 U.S.C. 102(b) as being anticipated by Singh et al., US Patent 5,686,196

Singh et al. disclose a system for operating a fuel cell which includes a solid oxide fuel cell, fuel storage containers, and an expander. The system includes both hydrogen and diesel fuel as fuel, and includes storage containers for both. The high pressure reformed fuel is delivered to an expander which depressurizes the reformed fuel for delivery to a conventional solid oxide fuel cell. (See column 4, lines 53-58.) With regards to claims 4, 5, 70 and 72, the hydrogen storage component of fuel storage may include a bed of hydrogen storage alloy as a gas sorbent, or a cryogenic storage system. (Column 4, lines 15-36.) With regards to claim 6, the expander is couples to pumps as shown in Fig. 1. With regards to claims 7, 8, and 78 the ambient atmosphere is a heat exchanger, which contains air as a working fluid. Since the atmosphere surrounds the system disclosed by Singh et al., heat will inevitably be transferred, at least in small amounts, from the atmosphere to the fuel in the fuel storage container.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 27, 28, 30-34, and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al., in view of Ippommatsu et al.

As discussed above, Singh et al. disclose applicants' invention essentially as claimed, with the exception that Singh et al. do not disclose a oxidant gas delivery system that can produce oxidant-enriched gas for delivery to the fuel cell. Ippommatsu et al. disclose a solid oxide fuel cell system which a pressure swing adsorption system (PSA) to enrich the air provided to the cathode with oxygen. (See column 4, lines 50-53 and c column 3, lines 16-19.) The use of oxygen enriched air increases the output density of the fuel cell and reduces the internal resistance of the fuel cells. (See column 3, lines 55-66.) Therefore, it would have been obvious to one of ordinary skill in the art to include a PSA in the fuel cell system described by Singh et al. in order to increase output density of the fuel cell and decrease the internal resistance of the fuel cell as taught by Ippommatsu et al. With regards to claim 31, the rotary pressure swing adsorption module recited by the applicants is considered to be sufficiently well known to one of ordinary skill in the art that it is encompassed by the Ippommatsu et al. disclosure of a pressure swing adsorption module. Similarly,

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with regards to claims 33 and 34, multi-stage expanders and positive displacement expanders are considered to be sufficiently well known to one of ordinary skill in the art that they are encompassed by the Singh et al. disclosure of expanders.

With regards to claim 74, Singh et al. do not specifically disclose the use of carbon material or zeolite as an adsorbent. Singh et al. teach purifying hydrogen prior to contact with hydrogen storage alloy, and as activated carbon is a well-known impurity adsorbent, it would have been obvious to one of ordinary skill in the art to include carbon in the hydrogen storage system taught by Singh et al. in order to remove impurities in the system, as suggested by Singh et al.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

St. Pierre et al., US Patent 6,627,338 B2

Viteri et al., US Patent 6,170,264 B1

Buck US Patent 5,832,728 A

Keefer US Patent 4,968,329

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol Chaney whose telephone number is (571) 272-1284. The examiner can normally be reached on Mon - Fri 8:30am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Carol Chaney  
Primary Examiner  
Art Unit 1745

22 November 2004